Getting Cadmium Out of Sunflower Seeds

The annual $25 to $30 million U.S. sunflower kernel market in Germany might have become a thing of the past, were it not for the efforts of the Agricultural Research Service.

The agency presented evidence that convinced German authorities to set a reasonable guideline for cadmium levels in kernels.

The Germans had been considering a 0.3 parts per million (ppm) maximum allowance for kernels destined for human consumption—a standard that would have been impossible to meet with current sunflower varieties. Instead, in 1992, the Germans set the level at 0.6 ppm, which U.S. farmers can reliably meet by avoiding a handful of high-clay soils in the Red River Valley.

But eventually it won't matter which soils sunflowers are grown on. As a long-term solution, ARS scientists are breeding hybrids that will take up less cadmium. The breeding effort is the focus of a cooperative federal, state, and industry project led by Rufus L. Chaney, an agronomist in the ARS Environmental Chemistry Laboratory in Beltsville, Maryland.

Chaney has worked with Jerry F. Miller, an ARS geneticist in Fargo, North Dakota, who is the plant-breeding cooperator on the project. Miller and colleagues selected the 200 strains that were tested to breed the new hybrids.

Cadmium is a trace metal that occurs naturally in all soils, although the levels are somewhat higher in soils in the Northern Plains sunflower country.

Chaney says the revised German guideline is not based on health risk but on typical cadmium concentrations found in crops grown on uncontaminated soils.

So he joined with other USDA colleagues and the National Sunflower Association in Bismarck, North Dakota, and with Albert A. Schneiter of North Dakota State University's Department of Crop and Weed Sciences at Fargo.

Chaney found that only high-clay soils—such as Fargo silty clay—and those containing high chloride levels produce seeds with cadmium levels above the guideline. Because of this finding, some sunflower companies have reduced the number of contracts with farmers for kernels grown on these soils.

In studying 200 sunflower genotypes in North Dakota and Minnesota, Chaney, Schneiter, Miller, and postdoctoral associate Yin-Ming Li found some that have genes for lower cadmium uptake.

"We tested these plants in fields in North Dakota to find the best ones," Chaney says. "The industry is already using the low-cadmium genes we have identified to breed new sunflower hybrids."

Two seed companies are doing the breeding work and one expects to have lower-cadmium hybrid seed for sale in 1996 or 1997.—By **Don Comis**, ARS.

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